

EDS COMPOUND SEMICONDUCTOR DEVICESAND CIRCUITS TECHNICAL COMMITTEE

Original

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Nominations are closed on 15 October, and the biographical resumes and endorsement letters are distributed to the 'full' voting members of AdCom prior to the December AdCom meeting. The election is then held after the conclusion of the meeting. *The nominees do not need to attend the AdCom Meeting/Election to run. On the other hand, if elected, the nominees are expected to attend the two AdCom meetings a year. While the December*

meeting is organized in connection with the IEEE International Electron Devices Meeting, the Spring meeting is frequently held outside the US. In general, the travel and accommodation costs to attend these meetings are borne by the elected member.

A continuing flow of new AdCom members who are interested in working for the improvement of the Society and its related technical areas is essential for the continued

development of EDS and the field of electron devices. Those interested in the field, the Society, and its operations are encouraged to attend AdCom meetings, become involved in Society activities, and consider running for election to AdCom.

Cor L. Claeys
EDS Chair of Nominations & Elections
IMEC
Leuven, Belgium

EDS COMPOUND SEMICONDUCTOR DEVICES AND CIRCUITS TECHNICAL COMMITTEE



Giovanni Ghione
EDS CSDC
Committee Chair

The EDS Compound Semiconductor Devices and Circuits Committee Chair for 2010 is Prof. Giovanni Ghione (Fellow, IEEE), from Politecnico di Torino, Torino, Italy, where he is a Full Professor in Electronics since 1992. Prof. Ghione's research field is in the modeling and design of active and passive components for RF, microwave and millimeter wave integrated circuits, mainly on compound semiconductors, also including widegap materials such as GaN, SiC and diamond. Research also included the physics-based numerical noise modelling of microwave active components in small- and large-signal regime and the modeling of high-speed optoelectronic devices (mainly detectors and electrooptic and electroabsorption modulators). Prof. Ghione has authored or co-authored more than 200 research papers on the above subjects and five books. He was a member of the QPC subcommittee of the IEDM in 1997–1998 and 2006–2007, as well as serving as

the Chair in 2008; he currently is the EU Arrangement Chair of the IEDM. He was also the Chair for the 2003 GAAS conference and a subcommittee chair on several SCs of the European Microwave Week beginning in the year 2000. Since 2007, he is the Head of the Department of Electronics, Politecnico di Torino.

Research on compound semiconductor devices and circuits continues to be a very active and exciting field. Besides steady progress in the traditional domain of high-frequency devices, where novel structures have been recently demonstrated (such as InGaAs FinFETs by Purdue, see Y.Q. Wu et al., IEDM Tech. Dig., 2009, pp. 323–326), significant advances have been achieved in the development of Ge or InGaAs channel MOSFET as the potential successor to Si MOSFET. Using an In_{0.7}Ga_{0.3}As quantum-well FET and high-k gate dielectric technology, excellent sub-threshold swing close to Si MOSFET was reported by Intel at 75 nm gate length. Besides, high drive current was reached even at a small voltage of 0.5 V; such a low voltage operation can significantly reduce the chip power consumption beyond the one obtained using strained Si. Key challenges remain

(but not limited to) in the Fermi-level depinned dielectric-semiconductor interface, and in a true scalability (not only concerning the gate length) of III-V MOSFETs.

Wide-bandgap semiconductor electronics shows continuous progress, with the development of AlGaIn/GaN HEMT-based RF/microwave power amplifiers and robust low-noise receivers in a steady upward trend. Research on devices continues with the extension of AlGaIn/GaN HEMTs (mainly on SiC substrates) to millimeter wave frequencies and the introduction of InGaIn/GaN HEMTs and AlGaIn/GaN MISFETs for microwave power applications.

However, wide-bandgap semiconductors such as SiC and GaN also offer outstanding properties for power conversion devices, high breakdown fields, high carrier saturation velocities, thermal stability, and high thermal conductivity. New excitement comes from the exploitation of GaN and SiC electronics in power and energy management (in connection with the increasing global demand for high-efficiency green energy technologies) to enable ultra-high-efficiency power electronics modules that minimise energy losses and that are capable of

operating at high-temperatures. Both GaN and SiC are viable semiconductor technologies for high-efficiency, high power and high-speed switching applications, with SiC having the added advantage of SiO₂ as a reliable native gate dielectric that enables the realisation of SiC-based metal-oxide-semiconductor field-effect transistors (MOSFETs) that are technologically similar to their Si-based counterparts. Efficient Power Conversion (EPC) has recently announced GaN power transistors based on Si substrates that are claimed to provide

significant performance advances, see <http://compoundsemiconductor.net/csc/features-details.php?cat=features&id=19658920>.

The 2010 EDS Compound Semiconductor Devices and Circuits Technical Committee members are: G. Ghione (Chair, Politecnico di Torino, Italy), S. Bandyopadhyay (Virginia Commonwealth University), K. Chen (Hong Kong Univ. Of Science and Technology), A. Chin (National Chiao Tung University, Taiwan), S. A. Dayeh (Los Alamos National Laboratory), L. Faraone

(University of Western Australia), G. Meneghesso (University of Padova, Italy), F. Ren (University of Florida) and M. Schlechtweg (Fraunhofer Institute, Freiburg, Germany).

Among future activities, the Committee would like to actively propose special issues in EDS periodicals focused on the most recent developments in the area.

*Giovanni Ghione
EDS CSDC Technical Committee Chair
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Torino, Italy*

MESSAGE FROM THE EDS NEWSLETTER EDITOR-IN-CHIEF



*Ninoslav D.
Stojadinovic
EDS Newsletter
Editor-in-Chief*

I am writing this message after a lapse of more than a year. It is sometimes astonishing to see how quickly time goes by. As professionals, all of us are very busy in our work. I hope that this issue comes at a very prosperous time in your career.

I would like to take this opportunity to thank two outgoing Regional Editors for outstanding service to the Newsletter and Electron Devices community. They are Cora Salm (Region 8 – Western Europe) and Xing Zhou (Region 10 – Australia, New Zealand & South Asia). Their outstanding voluntary contributions for the past six years, as regional editors, are exemplary to the rest of us.

Replacing Cora and Xing on the Newsletter Editorial Staff is Jan Vobecký and M.K. Radhakrishnan, whose biographies follow. It is my pleasure to welcome them as new editors for the *EDS Newsletter*.



Jan Vobecký (M'91, SM'00) received the Electrical Engineer (MSc.) in Electrotechnology and the Ph.D. degree in Microelectronics from Czech Technical University in Prague, Faculty of Electrical Engineering, Czechoslovakia, in 1981, 1988, respectively. He has been working mainly in the field of simulation and characterization of high-power devices including the control of carrier lifetime and defect engineering. In 1992, 1999, 2000, he received Associated Professor, Doctor of Science (DrSc.) and Full Professor degrees, respectively. From 1995–2006 he was the project manager of numerous University R&D projects with industrial partners (Motorola, Freescale, ABB, ON-Semiconductor, etc.). Since 2007, he is with ABB Switzerland Ltd. Semiconductors, Lenzburg, where he is engaged in the development of technologies for next generation Bipolar and Bi-MOS devices.

From 1996–1999, Dr. Vobecký was the committee member of the MTT/AP/ED Czechoslovakia (CS) Chapter, representing EDS. In 2002–2003 and

2004–2005 he served as the IEEE CS Section Chair and Vice-Chair, respectively. Since 2007, he has served as one of the three Vice-Chairs of the EDS Subcommittee for Regions and Chapters (SRC) in Region 8 as well as the Chapter Partner of CAS/ED Switzerland, ED Central & South Italy, AP/ED/MTT Northern Italy and ED/SSC Croatia.

He regularly serves as a reviewer of several international journals, including *IEEE Transactions on Electron Devices*, *IEEE Electron Device Letters*, *IEEE Transactions on Power Electronics*, *Microelectronics Reliability*, *Microelectronics Journal*, *Japanese Journal of Applied Physics*, etc.



M.K. Radhakrishnan (M-81, SM-94) received his Ph.D. in semiconductor physics from the University of Cochin, India in 1981.

Currently he manages *NanoRel – Technical consultants*, a technical consultancy firm he founded in Singapore which serves the microelectronics industries as well as higher education institutions. As a